Comparative Analysis of Image Based Positioning Techniques Based on Single Camera for Improving the Accuracy of Car Positioning

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**ABSTRACT:** The accuracy of GPS based car positioning system is dramatically degraded in GPS-denied environments such as urban canyon. To determine the stable and reliable car position in GPS-denied environments, studies applying various techniques in photogrammetry and computer vision have been conducted over the past decade. The techniques are classified by available information for improving accuracy of car position. There are three different available information: the absolute position and attitude of camera, the camera motion, and the relative attitude of camera. The absolute position and attitude of camera could be calculated by the SPR (Single Photo Resection) based on collinearity model. The camera motion could be estimated by variation of feature points between previous and current frame. As the visual odometry is one of techniques which could estimate the camera motion, it construct trajectory for improving stability and reliability of car positioning based on estimated camera motion. The relative attitude of camera is calculated by the variation of vanishing lines and point. The vanishing lines and point could be obtained from perpendicular or parallel edges such as traffic lanes. In this study, each technique mentioned above will be analyzed through the simulation tests considered various driving environments. And the pros and cons of the techniques are derived by the results of accuracy improvement of car positioning.

I prefer oral presentation.